THE PANAMA CANAL FROM A CONTRACTOR'S STANDPOINT.

BY GEORGE W. CRICHFIELD.

IN his very interesting discussion of the Labor Problem on the Panama Canal, in the July number of the REVIEW, Brigadier-General Hains overlooked certain important considerations affecting the number and character of employees required for that work. But before proceeding to consider his suggestions with reference to the best methods of doing the work, let us examine briefly the nature of the undertaking itself.

From Colon to Bas Obispo, a distance of twenty-nine miles, the territory is practically one vast *manglare;* that is, low marshy land, covered with the densest tropical growth of trees, vines and underbrush, so as to be entirely impenetrable in most parts, except for a man with heavy boots and a machete. During the rainy season, or about nine months in each year, the larger part of this territory is covered with water, which, as the wet season draws to a close, in places becomes stagnant. The ground is of the softest, richest loam, the product of the decay of thousands of years of dense tropical forests, and this, under water, becomes mud of the worst nature, filled with rotten logs, stumps, poisonous vines, thorns, dangerous prickly plants, and many trees of poisonous sap. The mosquitoes in these unending swamps are terrible, not alone in their number, but in the amount of poison which they convey in their stings. In these dense undergrowths, where the sun cannot penetrate, they are as numerous and vicious by day as by night; and it will be utterly impossible for workmen on this section of the Canal to protect themselves against their bites. I have stood behind a transit in just such a jungle, when, even at midday, I would be so thoroughly covered with mosquitoes that it would be difficult to tell the texture of my clothing, while from

the same cause the blood would be oozing in drops from all parts of the bodies of our horses, which were in camp. This mosquito poison produces the gravest consequences. Malaria in its most malignant form, frequently resulting in death, is due principally to the poison from mosquitoes, while a large percentage of the nervous derangements, which so seriously affect the heart and are so prevalent in tropical countries, are due to the same cause.

The horrors of the *manglare* are not yet fully described, nor indeed can they be. Snakes, of the most venomous type, are to be found without number. Strange to say, the most dangerous snakes are small, so that among the leaves it is almost impossible to see them.

For an ordinary white man, without experience, to attempt to penetrate these jungles alone means death, and nothing but death. Only natives, accustomed to the forests, and masters of the machete, are at all competent for the task. The climate in this section of the Canal zone is intolerable. Amateurs who take ship from New York to Colon in January, the best month of the dry season, and spend their time mostly under the shade trees on the beach in front of the Panama Railway Company's hotel, enjoying the sea-breezes, may return and report that the climate of Colon is all right, and that there need be no great mortality in digging the Canal. But the sea-breeze scarcely moves a leaf in these mighty jungles, and for nine months there is rain, rain, nothing but rain; while, at intervals, in the sticky, humid, suffocating atmosphere, the sun breaks through the clouds with a broiling, overpowering heat. The dry season is not long enough to enable the water to dry up, and even during that season there are showers and drizzling rains nearly every day.

These, then, are the unfortunate topographical and climatic conditions over more than half the territory through which will run the Canal. On the Pacific side, from Panama to Pedro Miguel, a distance of nine miles, a somewhat similar condition exists, but by no means so bad. The Canal there passes through extensive marshes, and great hardships and loss of life will inevitably be sustained in this section, but nothing in comparison with what will be experienced on the Atlantic side.

The intermediate section comprises what is known as "Culebra Cut," about eight miles in length, extending from Pedro Miguel to Bas Obispo. The ground here rises with considerable abrupt-

ness from each of the places named, and at Culebra, the lowest part of the ground is 330 feet above the level of the sea, while the hills extend much higher. This is the most picturesque and healthful section of Panama. Yellow fever never reaches Culebra, except sporadically, even when epidemic at Colon; there are no mosquitoes to speak of; and there is no reason why an army could not be encamped in any part of this territory as safely as upon the heights of the Hudson. The United States marines have been for a long time located at various points in this section, in perfect comfort and health.

I.

The preliminary report submitted by Admiral Walker's Isthmian Canal Commission contemplates the building of an immense dam at Bojio, a distance of seventeen miles from Colon. This dam would extend nearly half a mile, between two mountains, or high hills, crossing the channel of the Chagres River. Between Bojio and Bas Obispo the country is almost level, shaped like a dish, with a rim of higher ground surrounding it. The building of the Bojio dam will convert this territory into a large lake, with a surface of twenty-five or thirty square miles. It is argued that by this plan it will only be necessary, between Bojio and Bas Obispo, to do very superficial work along the Canal, the course of which would be indicated by buoys through the lake. Double locks would be constructed at Bojio, sufficient to lift the vessels ninety feet; and, of course, corresponding locks would have to be built on the Pacific side. Every time a vessel passed through the Canal, a large amount of water would be lost at the locks; while the overflow at the spillways would be continuous, so that it is necessary under this system to make provision for supplying the upper section of the canal with at least eleven hundred cubic feet of water per second. The auxiliary works required for the Canal, if this plan be adopted, are in themselves engineering problems of great magnitude, and it is to be feared that their cost, and the difficulties in the way of their execution, have been greatly underestimated. The foundations of the great Bojio dam, for instance, must be sunk more than 100 feet below the surface of the earth, in order to encounter a rock foundation, across the path of a treacherous and at times torrential stream. All the material must be transported long distances, and the work done under the climatic conditions above described. The other collateral works

contemplated by this plan are on an almost equally gigantic scale, and their magnitude and probable cost are sufficient to warrant the most searching investigation before the definite adoption of such a plan. Whether the Isthmian Canal Commission is fully committed to this particular lock-system is unknown.

The advocates of the lock plan have brought forth half a dozen schemes in times past for overcoming the Culebra Cut. One plan contemplated a series of six locks, to raise vessels 125 feet; and another ten locks to raise them 170 feet. By the latter system, two great dams would be required, one across the upper and the other across the lower Chagres, forming two lakes. One not familiar with engineering work can form but an inadequate idea of the massive masonry required for the construction of these dams and locks. If there is any merit at all in the lock system, it would appear that ten locks would be better than four, and two lakes better than one, for that would save 170 feet of cutting in the Culebra district instead of ninety. Indeed, it is difficult to avoid carrying this argument to its logical conclusion, by suggesting that, if the principal object is to get across the Isthmus with a minimum of digging, it would be better to abandon the idea of a canal entirely, and construct instead something after the plan of Captain Eads's fantastic ship-railway. De Lesseps figured that a lock canal would require 85,000,000 cubic yards of excavation less than a tide-water canal, and that $120,000,000 would complete the work, but his figures were entitled to no weight whatever. As a matter of fact, no one, even up to the present time, has given anything like an accurate estimate of the cost of the enormous auxiliary works which are indispensable in a lock system. De Lesseps spent about $300,000,000, of which $200,000,000 were stolen or wasted, and he never pretended to commence work on any lock or dam.

II.

After having made a careful study of the Canal on the ground in January and February last, I am constrained to dissent from the plan proposed by the Canal Commission for the construction of the work, as I likewise differ from the suggestions made by Brigadier-General Hains as to the methods of its performance. The Canal Commission, government engineers generally, and most writers on the subject, speak of a lock system as though it were a foregone conclusion, with its dams, reservoirs, aqueducts,

spillways, etc. No one seems to entertain the thought of a deep-sea Canal; it is taken for granted that locks are necessary; and the very mention of Culebra Cut calls forth exclamations of amazement at its vastness, and speculations as to the number of years necessary to accomplish the gigantic task of cutting it. In order to make this cut ninety feet shallower than would be necessary for a deep-sea Canal, the engineers stand ready to sink tens of millions of dollars in locks, dams and other appurtenances. To me all this seems a stupendous mistake, and I venture the prediction that, if the Canal is built on such a plan, it will not be fifty years until the United States will tear all these locks and dams out, and dig the Canal as it should be dug now—that is, forty feet below low tide-level.

Notwithstanding its apparent magnitude, the Culebra Cut is unquestionably the safest and easiest part of the Canal. It is the only place where white men can live and work in security. In that space of eight miles, machinists, engineers, contractors, foremen, laborers, superintendents, everybody connected with the work, will live as safely and comfortably as they could in New York or Illinois. The machinery required for handling material such as that in the Culebra Cut is of the simplest character, and comparatively inexpensive. An overhead cable, with a hoisting-engine, such as was used on the Chicago Drainage Canal, is the principal thing needed, and one of these will not cost over $10,000 installed for service. Where there is earth the skips can be loaded by steam-shovels; if there is rock, drills are necessary, but these are not costly. How to handle the Culebra Cut is the simplest and easiest problem connected with the Canal. Obviously, the work should be let in sections to private contractors. The proposition for the United States Government to attempt this work by day labor seems unwise. Uncle Sam is an excellent policeman, but he is a poor contractor. Work done by the Government is notoriously slow and expensive, hedged about with red tape and circumlocution. A Government department is the very graveyard of originality, energy and enterprise. Under such a method, every time the Chief Engineer had the earache, work all along the line would be demoralized until he recovered. Questions of rank, precedence, authority, political pull, and a thousand other extraneous matters would be injected into the enterprise, while Boards, Commissions, Investigating Committees, Congressional

junkets, would become as numerous as holidays in Latin America. Every Congressman and Senator would have his protégés to be shouldered on to Uncle Sam, and Panama would become the paradise of all the high-salaried loafers in the country. Besides, the legitimate administrative machinery for executing the work in such a manner would be cumbersome in the extreme, easily disorganized, liable to become the football of politics or to fall to pieces of its own weight.

The same remarks apply to any plan of awarding the contract to one large company. No contracting concern in the world has the resources, or, what is of more importance, the skilled superintendence and trained organization necessary for handling such a mammoth work. Nor can we afford to put the Canal at the mercy of the possible failure or mismanagement of any single corporation. In such a case, death or bankruptcy might seriously retard the work, while bad faith or incompetency might cause entanglements which it would require years to unravel. By letting the work in sections to many separate contractors, the nation would get the benefit of the judgment and experience of an army of men—superintendents, experts and foremen—who are accustomed to deal with and overcome all manner of obstacles. If one or more contractors should fail, or prove unequal to the task, no general demoralization would result, and there would be others fully equipped ready to take their places.

Culebra Cut should be divided up into twenty sections at the very least, possibly more, and each section should be let to a responsible contractor upon competitive bidding. If the Government would pay seventy-five per cent. of the value of the work, every two months, upon partial estimates, as the work progresses, a contractor with $200,000 capital could very easily handle one of these sections. The brainiest, most pushing and progressive contractors in the United States are not millionaires, but a responsible man of experience would have no difficulty in getting financial backing to that extent for a work of that character. Every contractor on the Culebra Cut should be required to establish one overhead cable for each one hundred linear yards of his section, with the corresponding tools and equipment necessary to keep it occupied. He should work night and day, stopping for Sunday only. The men should work in three shifts, the first from midnight to eight in the morning; the second from eight in the

morning to four in the afternoon; and the third from four in the afternoon to midnight. If the Culebra Cut were handled in this manner, there would be no difficulty in completing it, to a depth of forty feet below the level of the sea, in three years after the machinery was installed. Most of this machinery ought to be installed within ninety days after the contracts are let, for it is of the simplest character, and is carried in stock by the large supply houses. Establishing one cable-way for every one hundred yards for the whole length of Culebra Cut would mean about 150 cable-ways, costing somewhere from $1,500,000 to $2,000,000. Each of them should handle daily 500 cubic yards of excavation, working in three shifts of eight hours each, allowing twenty minutes to each shift for intermission. That would mean nearly half a million cubic yards a week, or the entire quantity estimated by the present plan in two years.

III.

The remainder of the Canal will be incomparably more difficult; and, notwithstanding the alluring figures made by the engineers, I predict it will prove vastly more costly. The great loss of life will occur between Colon and Bas Obispo, and the victims here will inevitably be numbered by the thousands. An American unaccustomed to tropical climates who accepts employment on this section will, more often than otherwise, pay the penalty of his ignorance with his life. All the Sanitary Boards on earth cannot prevent a frightful mortality in this section. There is no method known by which such vast jungles can be cleared of mosquitoes, and these malaria-breeding pests are more to be feared than yellow fever or small-pox.

This work should likewise be let by contract, in sections; but, as the work is largely dredging, it will be advisable to increase the length of the section. It would be a large contracting company which would attempt to dredge out more than one mile of this part of the Canal, and it would be advisable to let the work from Colon to Bas Obispo in twenty-nine separate contracts. On the same basis, nine contracts should be let from Panama to Pedro Miguel. This would be a total of fifty-eight separate contracts which the Canal Commission ought to make, and it is to be hoped that nearly that number of independent contracting concerns would take part in the work.

IV.

The question of making a deep-sea Canal, while we are about it, must be looked at, not only from the standpoint of the engineer or contractor, but from the broader view of practical statesmanship, which should ever be considering the future. Brigadier-General Hains remarks: "The Isthmian Canal Commission fixed upon 740 feet for the length of the locks, yet the ink with which the members penned their signatures to its report was scarcely dry before it was reported that the Cunard Line was about to begin the construction of one or more ships that would be too long to go through them." But if the Canal Commission was in error on such a vital yet simple matter, it cannot be assumed that its judgment is infallible on those greater and more complicated phases of the problem which it may require years or generations to develop. From the standpoint of the engineer or contractor, any plan of the Canal would be studied with reference to its practicability, first cost and future maintenance. But the statesman, whose opinion should be that of the great American people, while paying due regard to the engineer's or contractor's view, should look at the work with reference to the purpose for which it is designed to be used. Unquestionably, the transcendent object which the American people have in digging the Canal is to provide for the national defence. We speak of the Canal as a great work intended to promote commerce, and so it is incidentally; but not in a hundred years would this Canal have been built if that were its only object. Heavy freight is now shipped from San Francisco to New York by the Horn for six or seven dollars a ton. The cost of transshipping goods by the Panama Railway is by no means exorbitant; at least, it is not sufficient to justify such a vast undertaking from purely commercial motives. The fact is that the trip of the "Oregon," during the Spanish-American war, was a vivid object lesson to the whole American people. The vast extent of our coast, and the supreme importance of being able to reach all parts of our domain by interior lines, were impressed upon our people in a never-to-be-forgotten manner. The Canal is essential to our national defence, particularly if we should become engaged in war with a great naval Power. Peace conventions may talk of disarmament, and well-meaning writers may advocate a neutral Canal; but the moment we have war with a great naval Power, the United States will be compelled, as a

matter of self-preservation, to fortify the Canal, and defend it by every method in its power, for the purpose of permitting the passage of our own vessels, and preventing those of the enemy. From a military and naval standpoint, every fact and argument is in favor of a deep-sea Canal. To defend a deep-sea Canal implies merely fortifications at Colon and Panama, with some good iron-clad monitors in either harbor. No large body of land troops would be necessary, and the few needed could remain usually in the Culebra district. But how would we defend the Canal if it be built in accordance with the plans of the Isthmian Canal Commission? A stick of dynamite from the hands of an Indian would blow up the costly Alhajuela dam, or the Bojio dam, or the locks at Miraflores or Pedro Miguel, or the Gigantic Spillway, and an accident to any one of these would render the Canal useless for months or perhaps years. In the face of an alert enemy, it would be necessary to guard every one of these points, and many others, with a large standing army, for a small force might be surprised and overcome before reinforcements could reach it. As most of these works are to be located in the low country above described, it must be evident that our troops would die by the thousands, if compelled to remain there for the protection of the Canal during a war of any considerable length. Aside from the dangers of hostile invasion, our own experience with large dams, notably at Johnstown and Fort Worth, is anything but reassuring. The Bojio dam is designed to withstand the power of the Chagres, a stream which, during the heavy tropical rains, is a veritable torrent. No engineer can assert positively that that dam will stand. It will require years to build it; yet it may be swept away in an hour by a flood, or destroyed by an earthquake, or it may give way for any one of fifty reasons which the wisest engineer cannot foresee, in such event rendering the Canal absolutely useless, until it should be reconstructed. The cost of maintaining and operating a lock canal would be heavy, and even if a tide-level canal should cost $50,000,000 or $100,000,000 more, it would be cheaper in the end.

V.

Coming back to the contractor's view-point, I will express the opinion that the first cost of a deep-sea Canal would be absolutely less than that of the one proposed by the Commission, with

its enormous dams and locks. No one can probably estimate within $25,000,000 of what the Canal will actually cost, so that statements made on this phase of the case are, necessarily, largely conjectural. The United States engineers evidently believe that vast sums will be saved by their plan of construction, but all the figures which I have seen, and all my experience in contract work in the tropics, lead me to a different conclusion. Brigadier-General Hains's estimate of the number of men required for the work may be taken as an illustration. He allows 1,000 men, each, on construction of the locks at Bojio, Pedro Miguel and Miraflores, or 3,000 on locks; 1,000, each, on the Bojio dam, the Alhajuela dam, and the Gigantic Spillway, making a total of 6,000 men on dams and locks. He estimates only 1,000 men necessary for dredging purposes, and 3,000 at the outside for work at Culebra Cut; so that, according to his figures, nearly twice as many men would be employed on these appendages of the Canal as on the work proper. Personally, I do not think any such proportion would be necessary in actual construction; but it seems clear that the men required for this collateral work would be sufficient to make up the difference in the excavation of a deep-sea Canal. The bulk of this difference is comprised in the additional ninety feet which it would be necessary to cut at Culebra. It seems certain that if, in a given length of time, 3,000 men could finish the excavation of Culebra Cut to a depth of 270 feet, the addition of 6,000 men would finish the additional ninety feet required to make a deep-sea Canal, in which case all this tremendous system of dams and locks would be dispensed with. At all events, it would certainly be easier to figure definitely upon such items as dredging and excavation, than on all the complicated elements necessary to be considered in the lock system, involving foundations of uncertain materials in treacherous soil, the strains on huge masses of masonry, and a thousand other things not at present thought of.

VI.

With reference to the character of labor best adapted to the work, and the method of dealing with that labor, Brigadier-General Hains thinks that the Southern negroes "would furnish an excellent class of labor for work on the Isthmus," and that "they should be quartered in buildings provided by the Government, supplied with good, wholesome food, a certain amount of

light cotton working-clothes, and medical attendance." It is to be feared that the General has never had any experience in working negroes in the tropics. Give the average Southern negro "good, wholesome food," "light cotton working-clothes and medical attendance," and he would not do one good day's work in a month, unless an overseer stood over him with a lash, a thing which our Government could not permit. It is doubtful if a thousand million dollars would complete the Canal on such a plan. Despite the almost universal impression to the contrary, the Southern negro is totally unfit for work in the tropics. Every attempt to establish colonies of Southern negroes in Mexico, or other tropical or semitropical countries has resulted, not alone in failure, but in an appalling loss of life from small-pox, homesickness, and other causes. The negro is only an emotional child. He may make a brave dash on a battle-field, if a band is playing; but alone in a dark jungle at night, he is the veritable image of terror and despair. The Southern negro lives in a climate which, on an average, is magnificent. His work on the cotton plantations is exceedingly light, while that on the Panama Canal will be the heaviest in the world. The negro has not the power, which the white man possesses, of adapting himself to conditions, or overcoming danger. In Jamaica, Curaçao and Trinidad a sprinkling can be obtained of fairly good negro laborers, who have worked in mines in Colombia and Venezuela, and are therefore familiar with the rigors of the torrid zone, but little reliance can be placed even on those. They are a lazy, quarrelsome good-for-nothing lot, victims of constitutional diseases, and of an indolence even more deeply seated. If transported to Colon, the Southern negroes would die by the thousands. Homesickness would claim more victims than dysentery or malaria. But, whatever the cause, the sensational press could be relied upon to make the most of it, to the discredit of the National Administration, and the scandal of every official connected with the work. I have handled thousands of laborers of all nationalities on heavy works in the tropics, under precisely the conditions existing on the Isthmus, and I have found negroes to be the least desirable class. They are a positive detriment and nuisance, eating and wasting more food, calling for more medical attendance, doing less work, and causing more trouble than any other class.

In my opinion, the best and most available labor for the Canal

will be found among the native peons of the lowlands of Mexico, Central America and South America. These people are mostly descendants of the old Spanish *conquistadores* and the Indians. They have been accustomed all their lives to conditions such as prevail on the Isthmus, so they will not become panic-stricken on account of mosquitoes, snakes, rain, small-pox or yellow fever. These men are of slight build, but wiry and strong; mostly ignorant but exceedingly imitative, learning to do ordinary work in a marvellously brief space of time. Among the Mexicans, considerable numbers of engineers for steam-engines can be found, with a smaller number of fairly good mechanics.

On all sections of the Canal the civil and mechanical engineers, superintendents, foremen, and machinists should be Americans and Germans. Few Englishmen will be found adapted to this work; while, as a rule, Frenchmen and Spaniards are out of the question. Occasionally, a good Italian or Austrian foreman can be obtained, while many of this class, thoroughly acclimated, will be found capable of running hoisting-engines, etc. To talk of Chinese, or coolie, labor is a waste of words. Aside from questions of public policy, the Chinaman would be almost as worthless as a Southern negro, on the banks of the Chagres. At least eighty per cent. of all the ordinary labor on the Canal should be Latin-American peons, and at least the same proportion of the superintendents, etc., should be Americans and Germans. In the category of the Latin-Americans, I would place the Filipinos, who are descendants also of the Spaniards and Indians, and likewise accustomed to tropical jungles. Foremen should be selected, if possible, who are familiar with the habits and characteristics of these people. If handled properly, kindly but firmly, justly and without fear, with due regard to their peculiarities of disposition and temperament, these men will make the very best labor it is possible to obtain on the Canal. They should be made to board themselves, houses should be rented to them at a very low price, and medical attendance provided them free, or at a nominal charge. Gambling and the carrying of weapons should be prohibited, and the use of intoxicating liquors strictly regulated.

VII.

The thing for our Government to do, at the very outset of this great work, is to guard against red tape, and the next thing is to

prevent unnecessary waste of money and effort on things which are not essential to the main undertaking. The French spent vast sums in banquets, in buying needless machinery, in making lateral ditches, in drawings, and in numberless other ways. Never employing more than 30,000 workmen, they had an army of 3,000 or 4,000 clerks and office men. The chief function of most of these worthies appeared to be to wear silk hats, drink champagne, and draw big salaries. The plans alone of the Canal, made by the French, would fill a large room, and cost several millions of dollars. Why they should want the hundredth part of those plans, no practical contractor can imagine. A profile of the Canal itself ought to be almost as simple as that of a railway of the same length; while, according to my views, no plans at all are needed of the auxiliary works, for the simple reason that the works themselves are unnecessary. It is to be feared that the American engineers will follow in the footsteps of the French, in the production of vast numbers of elaborately detailed but unnecessary drawings. There has been so much time and money spent in this sort of work that I am almost tempted to say that we should go ahead and dig the Canal first, and make the drawings of it afterwards. A man who knows anything of construction work becomes disgusted at the evidences of French mismanagement visible everywhere along the line of the Canal, and impatient of anything which savors of delay. Millions of dollars' worth of machinery are scattered for fifty miles in utter ruin. Everywhere there is proof that the French spent money on every imaginable side issue, and on every scheme conceivable except the main work. It is evident that there is only one way to finish the Canal, and that is to dig dirt, but the French seem to have tried every other method. Shall we follow in their footsteps? Shall we waste millions on collateral issues, such as dams, reservoirs, locks, aqueducts, etc., instead of digging dirt as we ought to do? Shall we fuss along with this work for the next quarter of a century with a handful of Southern negroes? I believe that from 100,000 to 150,000 men can be advantageously employed on this Canal, and that it ought to be finished before the end of the next Presidential Administration.

The construction of the Canal should be regarded in precisely the same manner as the prosecution of a war. The sooner it is finished the better. It would be wiser to spend $200,000,000 or

even $300,000,000 and get the Canal completed in three or four years, than to have it drag along for twenty or thirty years at any price. The contractors doing the work should be paid good prices, and the most untiring activity should be demanded of them. In a battle, no general requires his officers to make detailed reports of the number of ounces of powder consumed, or calls them to account for having fired more shots than were probably necessary. On the contrary, his chief concern is that the enemy shall be defeated and at once. Having due regard to correct business principles and honest administration, the United States should avoid picayunish methods in connection with this great work. The proper policy is to pay good prices to the contractors, treat them liberally, and insist upon the best and promptest service possible. Contractors should be required to pay good wages to their men, and treat them fairly and liberally, giving employment to every man who can be advantageously used. Niggardliness should be avoided on the one hand, and the extravagance of the French on the other.

The United States ought to be advertising to receive bids at the present moment on all sections of the Culebra Cut. That work is perfectly simple, and any engineer ought in a month's time to draw specifications for it. Contractors should have sixty days in which to submit bids, and in ninety days after the award of the contracts, they should commence work. Within four years after work is commenced, the biggest steamship in the world ought to be able to pass from one end to the other without interruption. With from sixty to a hundred contractors, each working in three shifts daily, and employing from 1,000 to 2,000 men, with adequate machinery, there is no reason why this work should drag along for any great length of time. But if our engineers spend another year or two getting up plans, and the Government does the work with 8,000 or 10,000 Southern negroes, supplying them with "good food" and "clothing," our great-grandchildren will probably not see the work finished, nor will their great-grandchildren see the end of the payments on account of the expense which it will involve.

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